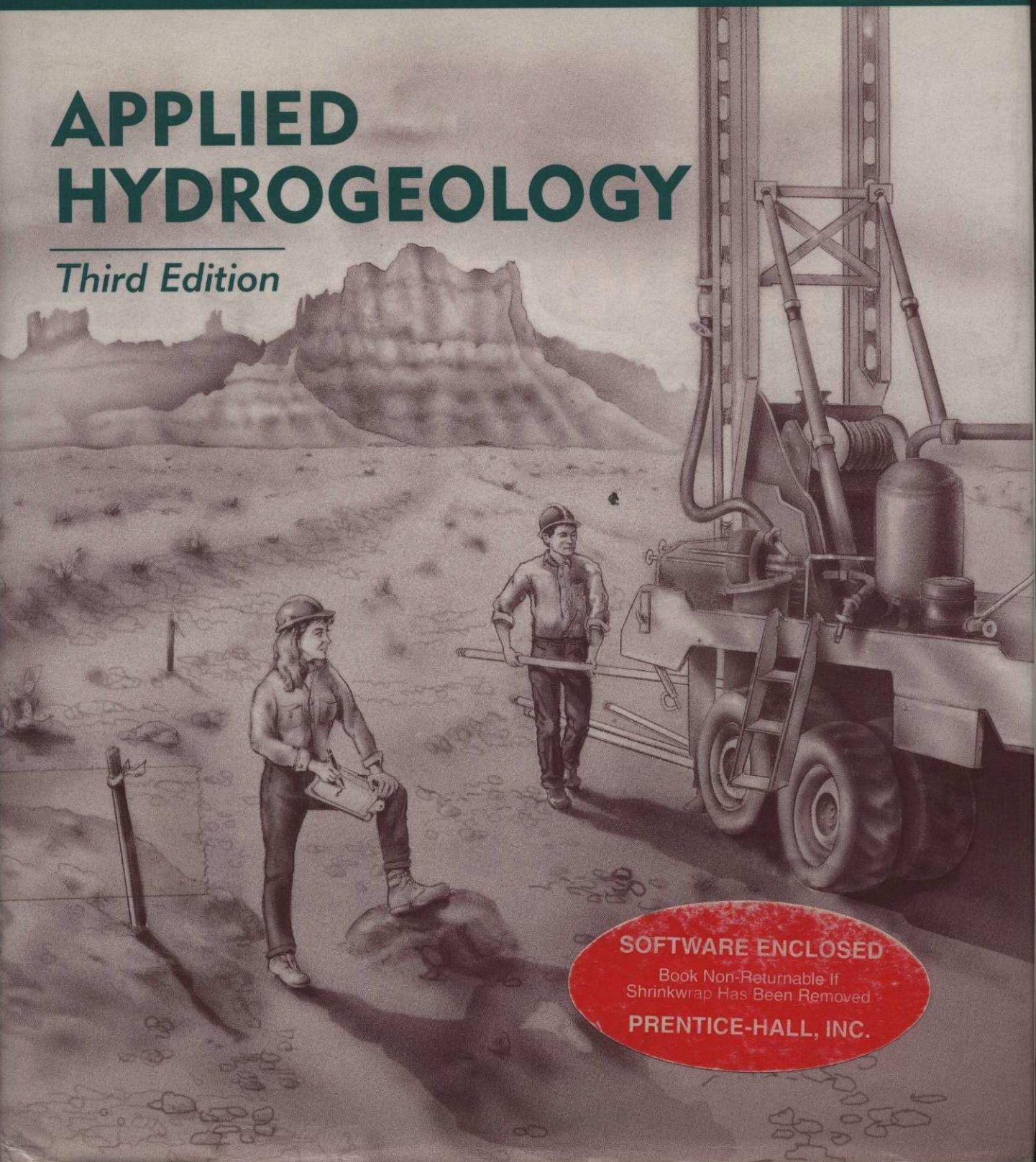


C.W. FETTER

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APPLIED HYDROGEOLOGY

Third Edition



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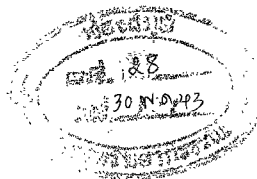
PRENTICE-HALL, INC.

Applied Hydrogeology

Third Edition

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Preface

Hydrogeology continues to be the fastest growing branch of geology in the United States. There is ongoing demand for trained hydrogeologists by consulting firms, state regulatory agencies and industrial firms. Most of the employment in hydrogeology is in the environmental area. Most recent graduates who may be well trained in the science of hydrogeology have little, if any, knowledge about the profession of hydrogeology. I have added a new section in the introductory chapter on the type of work done by hydrogeologists, the business of hydrogeology, and the ethics of hydrogeology. In Chapter 12 I have included a section on the responsibilities of the field hydrogeologist. I hope that this material will better prepare hydrogeology graduates for their future careers.

Applied Hydrogeology is intended as an introductory textbook for courses in hydrogeology at either advanced undergraduate or dual graduate/undergraduate levels and as a reference book for the working professional. The reader is expected to have a working knowledge of college algebra; calculus is helpful, but not necessary for practical understanding of the material. A background in college chemistry is necessary to understand the chapter on water chemistry. The book stresses application of mathematics to problem solving rather than derivation of theory. To this end, you will find many example problems with step-by-step solutions. Case studies in many chapters enhance understanding of the occurrence and movement of ground water in a variety of geologic settings. The expanded appendices, which are tables of various functions and tables for unit conversions, provide additional data for solving problems in well hydraulics, water chemistry, and contaminant transport. A glossary of hydrogeological terms makes the book a valuable reference.

This edition has many more end-of-chapter problems, with problems given for all but two chapters. In most cases the problems are paired. An odd-numbered problem will have the answer given in a section at the back of this text, and a similar even-numbered problem will follow without an answer. Instructors who have adopted the text can request a solutions manual from Robert McConnin, Executive Editor, Prentice Hall, Inc., 1633 Broadway, 8th Floor,

New York, New York 10019-6785. Please send your request on university letterhead.

Another new feature of this edition is the inclusion of a computer disk. The use of this disk is not necessary to master the basic elements of hydrogeology. It is intended as an enrichment activity and as an introduction to the use of computers in hydrogeology. The three programs on this disk are working student versions of programs used by ground-water professionals. They have been furnished free of charge by the software publishers. No technical support is furnished for these programs, either by the author, Macmillan College Publishing Company, or the software publishers. I have found them easy to use and very helpful in teaching students some basic computer applications.

Still more new features in this edition include a list of the notation used in each chapter, a discussion of problem solving by dimensional analysis and significant digits, and the grouping of all of the references cited at the end of the text. Most equations have been expressed in a form that can be solved with consistent units in either the English or SI system. For those few equations not in consistent unit form, both English and metric versions are given.

I would like to thank the many people who have helped me with the preparation of this edition. Comments on the second edition and suggestions for the third edition were given by: Dr. Hund-Der Yeh, National Chiao Tung University, Taiwan; and E. Scott Bair, The Ohio State University. The following reviewers provided valuable input for the third edition: George M. Hornberger, University of Virginia; Laura L. Sanders, Northeastern Illinois University; William W. Simpkins, Iowa State University; Stephen E. Silliman, University of Notre Dame; H. Leonard Vacher, University of South Florida; Edward A. Keller, University of California—Santa Barbara; William H. Harris, Brooklyn College—CUNY; John C. Ridge, Tufts University; Regina M. Capuano, University of Houston; Thomas R. Wood, University of Idaho; James A. Saunders, Auburn University; Leonard R. Gardner, University of South Carolina; Arthur Sengupta, Florida International University; Allen H. Johnson, West Chester University; Mark L. Lord, Allegheny College; Stephan G. Custer, Montana State University; and Keenan Lee, Colorado School of Mines. The following individuals provided reviews and comments on individual sections of text: E. Scott Bair, The Ohio State University; Nicholas Valkenberg, Geraghty and Miller, Inc.; Richard Stoll, Wisconsin Department of Natural Resources; Dr. William Ganus, Kerr McGee Corporation; and James Rumbaugh, Geraghty and Miller, Inc. I am grateful to Dr. C. J. Hemker for allowing me to give you a copy of FLOWPATHD and to Geraghty and Miller Software Group for creating and furnishing student versions of QUICKFLOW and AQTESOLV. Dr. Richard Parizek furnished photographs for Chapter 13. Mary Dommer was a great help in assembling the manuscript. Sue Birch helped me with ideas for the cover art. I thank the many students that I have had in my classes for their suggestions for improvement of the second edition and for finding typographical errors.

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